

Health Matters Brief

Riverside University Health System – Public Health
Epidemiology and Program Evaluation

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Unintentional Non-Fatal and Fatal Drowning in Riverside County, CA

INTRODUCTION

Drownings are fast, silent, and can happen to anyone. They can cause life-long disabilities due to lack of oxygen delivered to the brain. Long term effects can include damage to the central nervous system causing memory loss, seizures, paralysis, and learning disabilities. Drownings affect the cardiovascular system which impacts the future of drowning survivors and families who provide long-term care due to disability (Armstrong, E. J., & Erskine, K. L. 2018). All drownings are preventable, and yet drowning is the leading cause of injury-death in both the United States and California for children under the age of five (DDS, 2020, “Drowning Prevention & CDC, 2022, Drowning facts”).

Between 2018-2021, drownings were the first and second leading causes of death in children aged 1-4 in Riverside County. There were a total of 866 reported non-fatal incidents in Riverside County (residents and non-residents) with an age-adjusted rate of 38.3 per 100,000 population (2018-2022). Riverside County residents made up 657 (75.9 %) of non-fatal incidents with an age-adjusted rate of 29.1 per 100,000 population. During this same time-period, there were 220 deaths (residents and non-residents) of which 176 were residents with an age-adjusted death rate of 5.9 per 100,000 population. California had an overall age-adjusted drowning fatality rate of 1.1 per 100,000 population while Riverside County had 5.1 per 100,000 population (2018-2020). (CDC, 2023, “Web-Based Injury Statistic Query and Reporting System”). This brief is an introduction to unintentional fatal and non-fatal drowning in Riverside County from 2018-2022.

Riverside County Key Findings (2018 – 2022)



There were a total of 866 non-fatalities and 220 fatalities.



Children ages 0-4 make up 64.8% of non-fatalities (n=561).



There were an average of 173 non-fatalities per year.

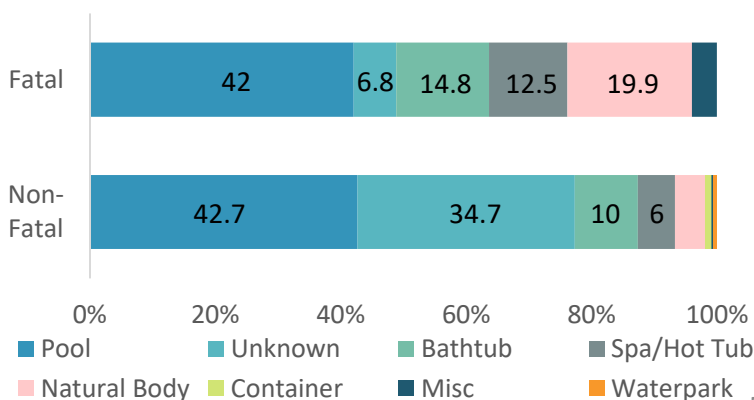


There were approx. 4 non-fatal drownings for every 1 fatality.

Location, Age, and Sex

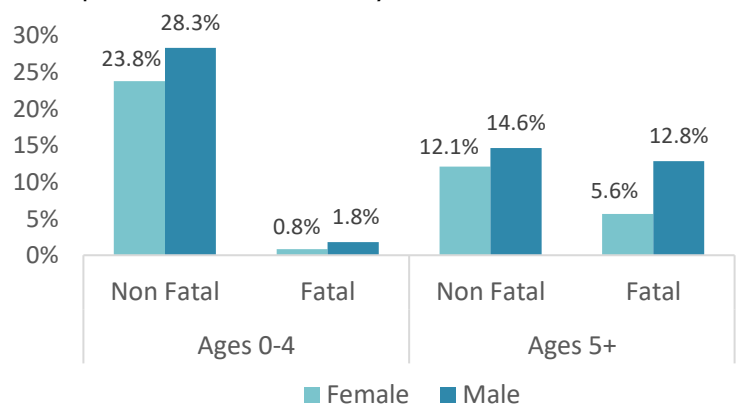
Among all non-fatal and fatal drownings, most incidents occurred in a pool. Few incidents occurred at an infrastructure such as a waterpark, canal or in a container such as a bucket or basket. Unfortunately, many non-fatal drowning events lack data and information including missing location.

Figure 1. Percent of Resident Injury and Death by Location, Riverside County, CA 2018-2022



Young children ages 0-4 and males of all ages are more prone to experience injury and death related to drowning. Males across all age groupings made up 56.6% of all non-fatal and fatal drownings (Figure 2). Children under the age of five made up 54.7% of non-fatal and fatal drownings. Fatalities are more likely to occur in ages five and over.

Figure 2. Number of Resident Non-Fatal/Fatal Drowning by Age Group and Sex, Riverside County, CA 2018-2022

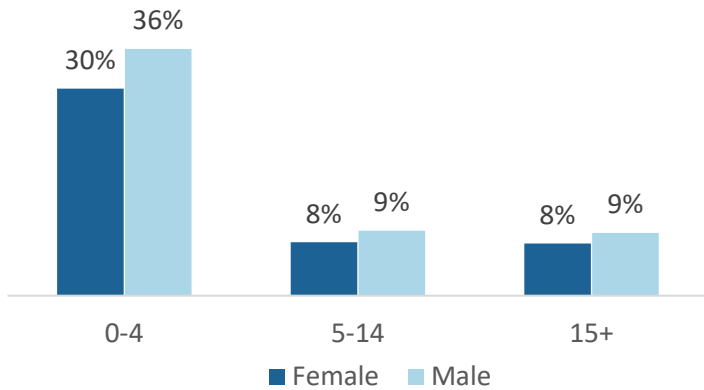


Drowning Morbidity

Demographics and Resident Status

Compared to other groups, children ages 0-4 are most affected by non-fatal drownings than any other age group. From 2018-2022, residents under the age of five had an age-specific non-fatal drowning rate of 290.3 per 100,000 population followed by ages 5-14 with 8.7 per 100,000 and 15+ with 4.8 non-fatal drownings per 100,000 population. The overall age-specific drowning rate was 29.1 per 100,000 population (Figure 3). These data show a need for interventions such as educating parents and caregivers about drowning risk and teaching prevention practices to reduce injuries and deaths.

Figure 4. Percent of Resident Non-Fatal Drowning by Age Group and Sex, Riverside County, CA 2018-2022



Males across all age groups are more likely to have a non-fatal drowning incident when compared to females. Children under the age of 5 have the highest percent of non-fatal drowning across all age groups (Figure 4).

Temporality

The summer months bring increased heat and thus more time outside with recreational activities involving water such as pools and beaches. From 2018-2022, non-fatal drowning incidents among Riverside County residents increased in the summer, peaking in June and July with 41.4% of incidents (Figure 6).

Figure 6 . Number of Resident Non-Fatal Drowning by Month, Riverside County, CA 2018-2022

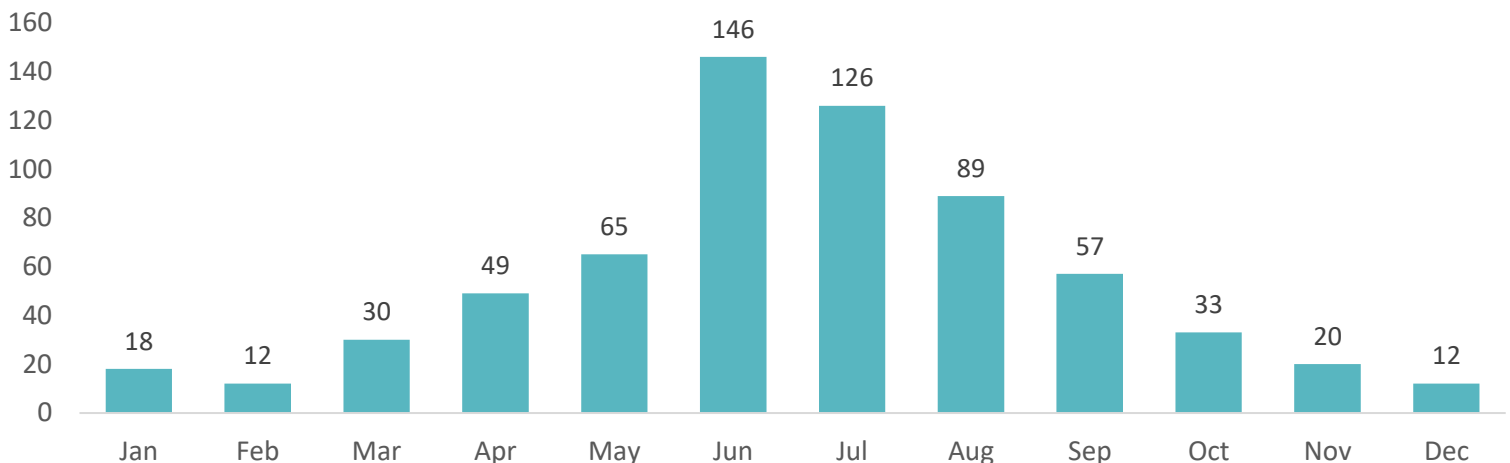


Figure 3. Resident Non-Fatal Drowning Rates by Age Group, Riverside County, CA 2018-2022

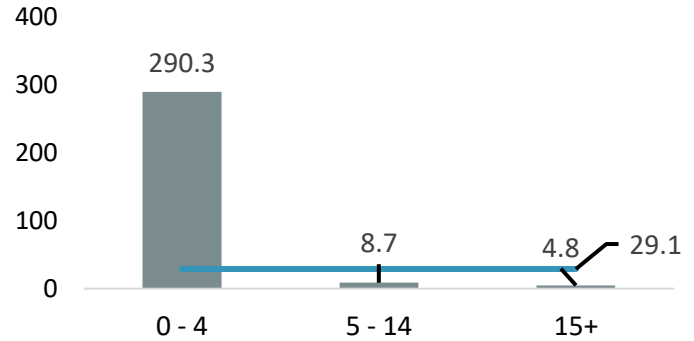
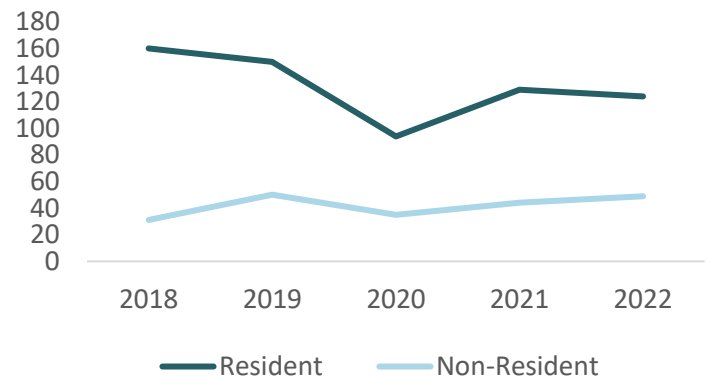


Figure 5. Number of Non-Fatal Drownings by Resident Status, Riverside County, CA 2018-2022



Riverside County resident non-fatal drownings have declined since 2018 however non-resident drownings have increased slightly from 2020-2022. Residents make up the majority (75.9%) of all non-fatal drownings across the county (Figure 5).

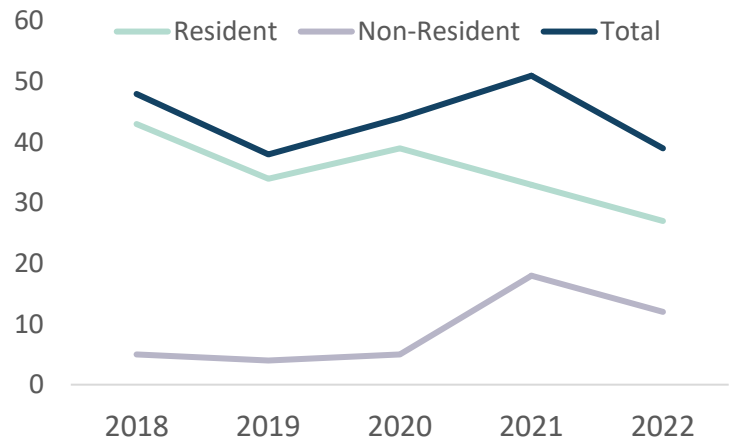
Drowning Mortality

Trends

A total of 220 drowning fatalities occurred in Riverside County between January 2018 and 2022. During this same time, the number of drowning deaths decreased among Riverside residents from 43 deaths in 2018 to 27 deaths in 2022. There were five non-resident drowning deaths in 2018, with a sharp increase of 18 fatalities in 2021, suggesting that our deaths were driven by non-residents/visitors. In 2022, there were 12 non-resident fatalities. (Figure 7).

Similar to non-fatal drowning, increases in fatal drowning are common during the summer months. Most fatalities occur in the months of July and August (n=62).

Figure 7. Riverside County, CA Number of Fatal Drownings by Resident Status and Year of Death



From 2018-2022, there were an average of 44 total fatal drownings a year, 72.3% were male.

Demographics of Fatal Drownings

The overall age-adjusted drowning death rate for Riverside County was 5.1 deaths per 100,000 population (2018-2020) while California drowning death rates were 1.1 per 100,000 population. When compared to the 2018-2020 rate, the county’s overall age adjusted death rate increased to 7.5 deaths per 100,000 population (2018-2022). Fatality rates were highest among the African American/Black population (12.0 per 100,000), followed closely by the White population (10.7 per 100,000), and (8.9 per 100,000) Multi-race populations (Figure 8).

Young children ages 1-4 and older adults 65+ made up 45.5% of all drowning deaths (Figure 9). Drowning deaths rates for children ages 1-4, 5-14 and adults 65+ declined from 2018-2022. All other age groups remained stable with a slight increase among persons aged 45-64. Although drowning can occur at any age, Riverside County had higher death rates in the younger and older age spectrum suggesting the need for increased awareness and prevention services for these two populations (Figure 9). There were an average of 20 deaths a year from these two age groups combined.

Figure 8. Riverside County, CA 5-Year Average Age-Adjusted Fatal Drowning Rate per 100,000 population by Resident Status and Race Ethnicity.

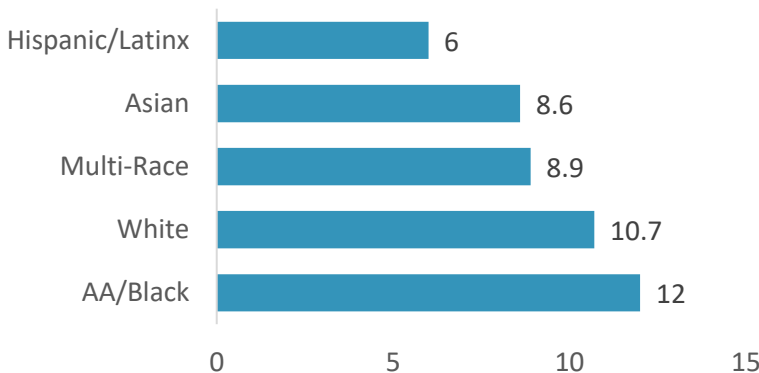
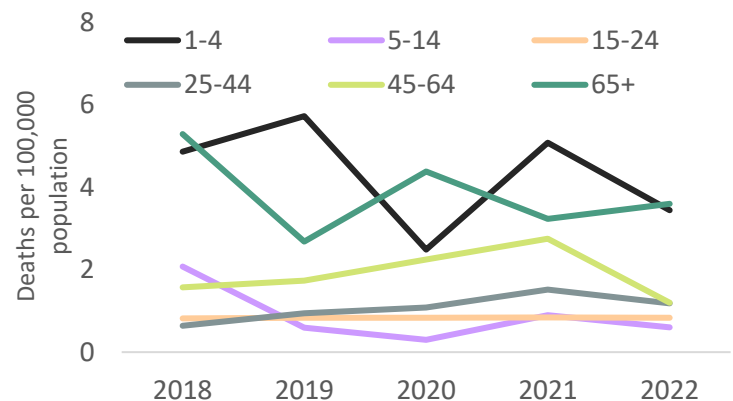


Figure 9. Riverside County, CA Fatal Resident Drowning Rate per 100,000 population by Year of Death



Conclusions

Non-fatal drowning data are not standardized and rely on hospital intake and history given by family, friends, and emergency services. It relies on an accurate portrayal of events and on robust hospital intake notes. For the years 2018-2022, 35.6% of non-fatal-drownings were missing the location of drowning such as pools or beaches, and 74.9% were missing a place such as a private residence or business. Drowning deaths have better reporting with only 6.8% missing location and 3.4% missing place recorded through hospital reports.

A need for improved hospital intake and reporting is a vital part of knowing what is occurring across the county and state. Linking data sources such as emergency services, hospitals, in addition to injury and death data would provide a more robust data system and help with more accurate reporting. Combining multiple data sources will decrease missing data fields such as time and location which will improve understanding of the epidemiology of drowning in Riverside County and better targeted interventions.

No single intervention is wholly protective against drownings. A multi-layered approach including interventions to address racial disparities, is necessary to reach various populations and meet the needs of multiple geographies and ages. Water safety includes uninterrupted supervision by parent or caregivers (including care for older adults) around all bodies of water, both natural and artificial. Creating barriers around pools, hot tubs and other bodies of water, providing free to low-cost swimming lessons, learning CPR and basic first-aid, and teaching children how to call 911 in an emergency are all crucial in reducing drowning and near drowning incidents. Non-fatal drownings and deaths are preventable and RUHS - Public Health is committed to keeping families of residents and non-residents safe.

Notes:

1. Non-fatal drownings are persons who received emergency care in a hospital.
2. Drowning fatalities are reported by injury date.
3. Misc. (Miscellaneous) defined as a channel, canal, roadway, or ditch.
4. Department of Finance 2020 population estimates were used for calculations.
5. (2018-2022). *Syndromic Surveillance: ESSENCE Riverside County*
6. (2018-2022). *Death Data: Cal-IVERS Riverside County California*
7. AA/Black is reporting African American and Black populations.
8. Current data sources only provide gender as binary; RUHS – Public Health fully supports the collection, analysis, and display of gender identity data. We continue to work with partners and advocate for the collection of this data for future reporting.

References

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